



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

27 JUN 2007

FIRST CLASS MAIL

Mr. Prasad V. Tamminayana
Environmental Engineer
ConocoPhillips Trainer Refinery
4101 Post Road
Trainer, PA 19061

RE: United States et al. v. ConocoPhillips Company, Civil Action No. H-05-0258
(S.D. Tex. Dec. 5, 2005) – Tail Gas Flaring Incident on June 12-20, 2006 at the Trainer,
Pennsylvania Refinery

Dear Mr. Tamminayana:

The United States Environmental Protection Agency (EPA) received a report dated July 28, 2006, regarding the June 12-20, 2006 tail gas incident at the Trainer, Pennsylvania refinery. Based on the information contained in the report, EPA has determined that the Root Cause of the incident was the shutdown of Sulfur Recovery Unit (SRU) Train No. 2 because of a leak in an expansion joint and the subsequent diversion of tail gas to the incinerator during the shutdown. No stipulated penalties are being assessed.

ConocoPhillips (Conoco) reported that the June 12-20, 2006 tail gas incident lasted for a period of 189 hours and resulted in the release of 6,777 pounds (3.39 tons) of sulfur dioxide (SO₂) to the atmosphere. Actual data submitted after the report date by Conoco indicates that the incident lasted for a period of 194 hours and resulted in the release of 8,740 pounds (4.37 tons) of SO₂ to the atmosphere. ConocoPhillips indicated that the Root Cause of the tail gas incident was the shutdown of SRU Train No. 2 for repairs and the subsequent venting of the remaining tail gas to the incinerator after it was shutdown. Conoco states that they detected a leak in SRU 2 and continued to operate the unit for three days while SRU Train No. 1 was brought online from a maintenance shutdown. Once SRU 1 reached optimum temperature, acid gas was diverted from SRU 2 to SRU 1 and the shutdown of SRU 2 began. Conoco indicated that normal operating procedures require a sulfur soak be performed on a SRU train after shutdown to remove any remaining sulfur and prevent future plugging. Also, the sulfur soak oxidizes and iron sulfides left in the SRU to prevent any possibility of fire in the unit. ConocoPhillips shutdown procedures state that a sulfur soak is initiated after the SRU is shutdown.

In an effort to limit the duration of the tail gas incident, ConocoPhillips frequently monitored the sulfur legs using look boxes to prevent excess time in sulfur soak mode. The sulfur soak was considered finished when liquid sulfur was no longer flowing through the liquid outlets on the sulfur condensers.


To prevent future incidents for the same Root Cause, ConocoPhillips has proposed to review normal sulfur soak shutdown procedures along with associated equipment to ensure that they are designed to minimize emissions. Also, they will conduct a peer review of sulfur soak procedures at other ConocoPhillips refineries to identify best practices that can contribute to minimizing emissions of SO₂. EPA suggests that Conoco investigate fully their shutdown procedures to ensure that all as much tail gas as possible has exited the SRU before initiating a shutdown.

EPA has determined that this event meets the conditions of Paragraph 161(a) for a first time event and is not subject to the stipulated penalty provisions of Paragraph 332.

This incident represents the second tail gas incident at the Trainer Refinery in a rolling twelve month period.

If you have any questions regarding this letter, please contact Bruce Augustine of the Air Protection Division, at (215) 814-2131.

Sincerely,



Judith M. Katz, Director
Air Protection Division

cc: Teresa Dykes, U.S. EPA, HQ (electronically)
Sharon Braby, U.S. EPA, Region VI
Clare Sullivan, Matrix New World
David Brown, PADEP Southeast Region



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FIRST CLASS MAIL

Mr. Prasad V. Tamminayana
Environmental Engineer
ConocoPhillips Trainer Refinery
4101 Post Road
Trainer, PA 19061

RE: United States et al. v. ConocoPhillips Company, Civil Action No. H-05-0258
(S.D. Tex. Dec. 5, 2005) – Tail Gas Flaring Incident on May 24 & 25, 2006 at the
Trainer, Pennsylvania Refinery

Dear Mr. Tamminayana:

The United States Environmental Protection Agency (EPA) received a report dated July 7, 2006, regarding the May 24-25, 2006 tail gas incident at the Trainer, Pennsylvania refinery. Based on the information contained in the report, EPA has determined that the Root Cause of the incident was due to a Startup of the Sulfur Recovery Plant (SRP) after a total refinery turnaround and was a first time occurrence under the Consent Decree. ConocoPhillips reports a total refinery maintenance turnaround occurs at the Trainer Refinery once in 5 years. No stipulated penalties are being assessed.

ConocoPhillips reported that the May 24-25, 2006 tail gas incident lasted for a period of 25.1 hours and resulted in the release of 2090.5 pounds (1.05 tons) of sulfur dioxide (SO₂) to the atmosphere. ConocoPhillips indicated that the Root Cause of the tail gas incident was the low acid gas flow rate to the SRP during the refinery startup and the subsequent bypassing of tail gas around the Shell Claus Off-gas Treater (SCOT) unit. During the total refinery startup, ConocoPhillips, first, introduced acid gas to one of the Sulfur Recovery Units (SRU) in the SRP as the different sour gas producing process units were brought online. Once a sufficient amount of acid gas was present in SRU No. 2 to maintain stability, the tail gas was introduced to the SCOT unit for processing. In the 13 hour interval the tail gas was routed to the SRU incinerator stack

In an effort to limit the duration of the tail gas incident, ConocoPhillips operators brought additional process units online as quickly as possible. In addition, once stable operation was achieved, tail gas was immediately introduced to the SCOT unit.

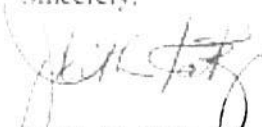
In an effort to prevent future incidents for the same Root Cause, ConocoPhillips has proposed to review temporary installation of additional instrumentation to assist unit troubleshooting during startup of either sulfur train, especially with low acid gas rates. Second, ConocoPhillips will review processes and/or possibilities to increase acid gas rates more quickly so as to minimize or eliminate the need to bypass the SCOT unit during startup. EPA suggests ConocoPhillips also investigate other refiners' expedited startup procedures for SCOT tail gas units.

EPA has determined that this event meets the conditions of paragraph 161(a) for a first time event and is not subject to the stipulated penalty provisions of paragraph 332.

This incident represents the first tail gas incident at the Trainer Refinery in a rolling twelve month period.

If you have any questions regarding this letter, please contact Bruce Augustine of the Air Protection Division, at (215) 814-2131.

Sincerely,



Judith M. Katz, Director
Air Protection Division

cc: Teresa Dykes, U.S. EPA, HQ (electronically)
Sharon Braby, U.S. EPA, Region VI
Clare Sullivan, Matrix New World
David Brown, PADEP Southeast Region



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

CERTIFIED MAIL/RETURN RECEIPT REQUESTED

19 JUL 2007

Refinery Manager
ConocoPhillips Company
Trainer Refinery
4101 Post Road
Trainer, PA 19061

RE: United States et al. v. ConocoPhillips Company, Civil Action No. H-05-0258
(S.D. Tex. Dec. 5, 2005) – Acid Gas Flaring Incident on April 2 – May 19, 2007, at the
Trainer, Pennsylvania Refinery

Dear Sir:

The United States Environmental Protection Agency (EPA) received reports dated May 7 and June 14, 2007, regarding the April 2 – May 19, 2007 acid gas flaring incident at the Trainer, Pennsylvania refinery. Based on the information contained in the report, EPA does not object to the corrective action that ConocoPhillips proposed and implemented but also finds that the corrective action is incomplete. We set forth in this letter additional corrective actions to be taken together with a request for the most expeditious schedule possible for implementation. In addition, we are working with the Pennsylvania Department of Environmental Protection (PADEP) to evaluate the stipulated penalties that appear to be due and owing as a result of the incident. At this time, and in light of your phone calls to my staff regarding this matter, we await from ConocoPhillips any additional information you seek to provide before finalizing our position on stipulated penalties.

ConocoPhillips reported that the April 2, 2007 acid gas flaring incident lasted for a period of 1,119 hours and resulted in the release of 76,404 pounds (38.20 tons) of SO₂ to the atmosphere. ConocoPhillips indicated that the Root Cause of the acid gas flaring incident was the failure to follow written procedures during the startup of the Sour Water Stripper (SWS). Specifically, there was no check-off to verify the block valve from the SWS overhead accumulator line to the Main Flare was closed, as required. A second Root Cause identified by ConocoPhillips was that its corrective actions proposed from a previous acid gas flaring incident were not adequate. The event was discovered when upon startup of the SWS, operators noticed a lack of air demand to the SRU 1 when acid gas feed is introduced. In normal operation, the demand for combustion air would increase as acid gas feed is introduced to the sulfur train. Operators determined that the block valve to the Main Flare had not seated properly and sour gas was leaking to the flare. The valve was opened and re-closed to achieve a tight seal and

ConocoPhillips believed, at the time, that the valve was properly closed. After the valve was supposedly closed, operators noticed a pressure increase on the SWS Overhead Accumulator indicating a blockage in the line. ConocoPhillips steamed the line to remove the blockage and normal flow was returned to Sulfur Train #1 at 20:10 on April 2, 2007.

During the week of May 14, 2007, ConocoPhillips was preparing for a shutdown of the SWS when it discovered an elevated temperature in the line from the accumulator block valve to the Main Flare. This indicates that the valve was not properly seated and was still leaking sour gas to the flare. ConocoPhillips decided to completely replace the valve during the scheduled shutdown later that week. A revised SO₂ emissions estimate was performed since the amount of sour gas going to the flare was greater than originally presumed.

In an effort to limit the duration of the acid gas flaring, ConocoPhillips indicated that it responded quickly to the event because operators could determine that the system was not responding as expected. EPA's position is that since ConocoPhillips originally believed the event lasted for four hours, it could have reasonably been expected to reduce feed rates to process units that produce sour gas.

To prevent future incidents based on the same Root Cause, ConocoPhillips indicated in its original report that it would modify the SWS startup procedures with specific instructions for ensuring that the valve to the flare was not leaking by adding a check-off step. Second, ConocoPhillips committed to replacing the block valve to the Overhead Accumulator sour gas line to the flare during the next shutdown of the SWS. ConocoPhillips indicated in the June 14, 2007 report that the corrective actions were completed on May 23, 2007.

EPA does not object to ConocoPhillips' proposed corrective actions. However, pursuant to Paragraph 156, we find the proposed corrective actions incomplete, and we seek additional corrective actions. First, it appears that ConocoPhillips' prior attempt to correct the problem leading to this flaring incident likewise involved changing startup procedures to verify that the vent valve was sealed. However, that corrective action did not prevent a recurrence. Therefore, we are concerned that ConocoPhillips' current procedural revisions might likewise be insufficient. Therefore, we request that you prepare written procedures to periodically check all valves in the sour water system for leakage. Then, submit these procedures to EPA and PADEP.

Second, we request ConocoPhillips to investigate, as expeditiously as possible, the condition of all valves in the system which could leak sour gas to the flare header and replace all such valves that have deteriorated.

By no later than 10 days from receipt of this letter, ConocoPhillips shall provide EPA and PADEP with a schedule for undertaking these additional corrective actions in the most expeditious manner possible.

With respect to stipulated penalties, our analysis currently is as follows. ConocoPhillips stated that the April 2 – May 19, 2007 acid gas flaring incident was not the result of a

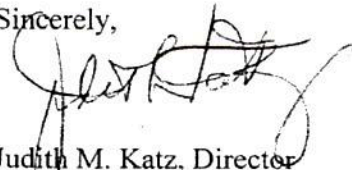
malfunction of process equipment and did not meet the requirements of a "First Time" event under Paragraph 161(a). We agree. The Trainer Refinery experienced an acid gas flaring incident on June 3-5, 2006, which ConocoPhillips reported was due to a SWS valve which did not seat properly and subsequently leaked sour gas to the Main Flare. Therefore, the recent event is a recurrence of a previous event which has the same Root Cause under Paragraph 161(b).

In addition, EPA's position is that, under Paragraph 158(b) & (c), the Root Cause of the recent acid gas flaring incident is the result of both ConocoPhillips' failure to operate and maintain equipment consistent with good engineering practice (i.e., the valve had been allowed to deteriorate) and a failure to follow written procedures. It therefore appears that ConocoPhillips will be subject to stipulated penalties for this flaring incident. However, before assessing and demanding stipulated penalties, we will allow ConocoPhillips to provide us with any information that it deems useful in discussing stipulated penalties.

This incident represents the third acid gas flaring incident at the Trainer Refinery in a rolling twelve month period.

If you have any questions regarding this letter, please contact Bruce Augustine at (215) 814-2131.

Sincerely,



Judith M. Katz, Director
Air Protection Division

Cc (electronically): Teresa Dykes, U.S. EPA, HQ
Sharon Braby, U.S. EPA, Region 6
Bruce Augustine, U.S. EPA, Region 3
Clare Sullivan, Matrix New World
Francine Carlini, PADEP, Regional Manager, Air Quality
David Brown, PADEP Southeast Region
Cully Farhar, Program Manager, ConocoPhillips
Thomas J. Myers, HSE Manager, U.S. Refining, ConocoPhillips
Donna Carvalho, Senior Counsel, ConocoPhillips



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

11 OCT 2007

Mr. Milind Bhatte, PhD
Environmental Lead
ConocoPhillips
Trainer Refinery
4101 Post Road
Trainer, Pennsylvania 19061

RE: United States et al. v. ConocoPhillips Company, Civil Action No. H-05-0258 (S.D. Tex. Dec. 5, 2005) – Acid Gas Flaring Incident on April 2 – May 19, 2007, at the Trainer, Pennsylvania Refinery

Dear Mr. Bhatte:

This is in response to your July 30th and August 31st, 2007 letters regarding the April 2 – May 19, 2007 acid gas flaring incident at the Trainer, Pennsylvania refinery. In your July 30, 2007 letter, you indicate that the Trainer Refinery actually experienced two acid gas flaring events; one which began on April 2, 2007, and the second which began sometime between April 2 and May 14, 2007. ConocoPhillips ("Conoco") submitted a second incident report for what Conoco believes was the second flaring incident. However, in that report Conoco does not provide a date that the flaring incident began nor does it provide a duration for the incident, as required by Paragraph 153(a) of the Consent Decree. Conoco also indicates a sulfur dioxide emission rate of 0.71 tons/day for the incident. The U. S. Environmental Protection Agency (EPA) Region III disagrees with Conoco's assertion that this is two separate events because Conoco has not provided sufficient evidence to suggest that the valve was not leaking once the valve was open and closed to remove the blockage in the sour gas feed line. In addition, Conoco has not provided a rationale why this is not a repeat incident for the same Root Cause as the June 2006 acid gas flaring event.

Although the argument can be made that the degradation of the sour gas valve increased over time, Conoco cannot demonstrate that the valve did not begin leaking immediately and some leakage to the flare of acid gas was occurring continually from April 2, 2007 until the unit was shutdown on May 19, 2007. Conoco has determined that the sulfide dioxide (SO₂) emission rate on May 19, 2007 was 1,429 lb/day.

You indicated in your letter that Conoco plans on installing a hydrogen sulfide (H₂S)

Continuous Emissions Monitoring System (CEMS) on the Main Plant and Sour Gas Flares to determine if elevated levels of sour gas are being sent to the flares because of leaking valves. EPA agrees that this is an acceptable alternative to EPA's proposal of preparing written procedures for periodically checking valves in sour water service for leaks and does not object to this aspect of Conoco's proposed corrective action. Conoco shall provide a date that the CEMS will be installed.

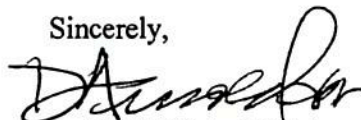
For any valves in sour gas service that will not be monitored by the CEMS and until the CEMS are installed, Conoco has proposed to conduct quarterly temperature monitoring upstream and downstream of the valves. Elevated temperatures could indicate a possible valve leak. EPA instead requests that Conoco conduct the monitoring monthly rather than quarterly since, as evidenced by this event, a large amount of sour gas can pass through a valve in 45 days.

Conoco has indicated that it will use the temperature monitoring and CEMS data to determine which, if any, valves need to be investigated for deterioration. Further, Conoco will implement corrective actions to correct the problem based on the valve's age, service, leakage rate, process configuration, etc. Conoco has not provided any detailed description of what corrective action(s) may be appropriate or any valves that will be investigated, and what criteria will be used to determine how the valve(s) will be fixed. Within 45 days following the discovery of a leaking valve in sour gas service by the methods described above, Conoco shall provide EPA and PADEP with a detailed valve corrective action plan. The plan shall include a matrix based on, but not limited to, the parameters mentioned (valve age, service, leak rate, process configuration, etc.) detailing the methods used to repair the valve(s) and when the valve leak will be corrected or the valve replaced.

It remains EPA's position that the April 2 – May 19, 2007 acid gas flaring incident(s) were not the result of a malfunction of process equipment and did not meet the requirements of a "First Time" event under Paragraph 161(a). As stated previously, the Trainer Refinery experienced an acid gas flaring incident on June 3-5, 2006, which ConocoPhillips reported was due to a SWS valve which did not seat properly and subsequently leaked sour gas to the Main Flare. Therefore, the recent event is a recurrence of a previous event which has the same Root Cause under Paragraph 161(b). EPA continues to assert that the flaring event is subject to the stipulated penalty provisions of Paragraph 158. Although a demand for stipulated penalties is not being made in this letter, a discussion on an appropriate penalty based on the matrix in Paragraph 332 and the facts of the incident is necessary.

If you have any questions regarding this letter, please contact Bruce Augustine of the Air Protection Division, at (215) 814-2131.

Sincerely,



Judith M. Katz, Director
Air Protection Division

Cc (electronically): Teresa Dykes, U.S. EPA, HQ
Sharon Braby, U.S. EPA, Region 6
Clare Sullivan, Matrix New World
Francine Carlini, PADEP, Regional Manager, Air Quality
David Brown, PADEP Southeast Region
Cully Farhar, Program Manager, ConocoPhillips
Thomas J. Myers, HSE Manager, U.S. Refining, ConocoPhillips
Donna Carvalho, Senior Counsel, ConocoPhillips



CJPY

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

22 APR 2008

FIRST CLASS MAIL

Mr. Prasad V. Tamminayana
Environmental Engineer
ConocoPhillips Trainer Refinery
4101 Post Road
Trainer, Pennsylvania 19061

RE: United States et al. v. ConocoPhillips Company, Civil Action No. H-05-0258 (S.D. Tex. Dec. 5, 2005) – Acid Gas Flaring Incident on September 9, 2007 at the Trainer, Pennsylvania Refinery

Dear Mr. Tamminayana:

The United States Environmental Protection Agency (EPA) received a report dated February 29, 2008 regarding the September 9, 2007 acid gas flaring incident at the Trainer, Pennsylvania refinery. Based on the information contained in the report, EPA has determined that the Root Cause of the incident is a "First Time" event under Paragraph 161(a)(2). Therefore, no stipulated penalties are being assessed for this event.

ConocoPhillips (Conoco) reported that the September 9, 2007 acid gas flaring incident lasted for a period of 0.67 hours and resulted in the release of 700 pounds (0.35 tons) of sulfur dioxide to the atmosphere. ConocoPhillips indicated that the Root Cause of the acid gas flaring incident was the loss of pressure in the low pressure boiler feed water system due to another unit using a large amount of water from the boiler feed water system. The boiler feed water pump automatically shutdown due to the low level, which caused a drop in the Sulfur Recovery Unit (SRU) steam generator boiler feed water level. The loss of the SRU steam generator boiler caused an immediate shutdown of the SRU. As a result, sour gas from the Sour Water Stripper was sent to the Sour Gas Flare, acid gas from the Amine Stripper was sent to the Acid Gas Flare, and tail gas from SRU #2 Train were diverted to the SRU Incinerator. Conoco also indicated that during the re-start of the SRU, tail gas was diverted around the Shell Claus Off-gas Treater (SCOT) Unit to the SRU Incinerator. A contributing cause of this event was that Conoco does not have an emergency procedure for the start-up of the SRU after the safety shutdown system automatically shuts the SRU down.

In an effort to limit the duration of the acid gas flaring, ConocoPhillips indicated that it returned the SRU to operation less than 40 minutes after the shutdown in order to reduce the emissions associated with the event.

In an effort to prevent future incidents for the same Root Cause, ConocoPhillips will develop/amend procedures to highlight potential consequences of water use from the low pressure boiler feed water system and the importance of effective communication while back flushing desalters. In addition, Conoco will develop an emergency procedure to direct action to start the SRU after a unit trip due to engagement of the automatic safety shutdown system. Conoco will also train appropriate personnel on the emergency procedures. EPA agrees with the corrective actions contained in the report.

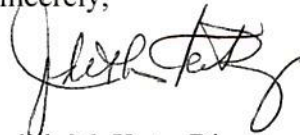
ConocoPhillips stated that the September 9, 2007 acid gas flaring incident was sudden and infrequent, and was reasonably preventable through good engineering practice. Corrective actions will be implemented to prevent future events for the same Root Cause. Conoco also indicated that the event meets the requirements of a "First Time" event under Paragraph 161(a).

EPA agrees with Conoco's position that the event meets the definition of a "First Time" event under paragraph 161. Also, Conoco shall implement the corrective actions to minimize the possibility of future acid gas flaring events resulting from the shutdown of the boiler feed water pumps and SRU. No stipulated penalties are being assessed for this incident.

This incident represents the second acid gas flaring at the Trainer Refinery in a rolling twelve month period.

If you have any questions regarding this letter, please contact Ms. Erin Smith of the Air Protection Division, at (215) 814-2152.

Sincerely,

A handwritten signature in black ink, appearing to read "Judith M. Katz", written over a horizontal line.

Judith M. Katz, Director
Air Protection Division

cc: Teresa Dykes, U.S. EPA, HQ
Sharon Braby, U.S. EPA, Region 6
Clare Sullivan, Matrix New World
David Brown, PADEP Southeast Region



Milind Bhatte, PhD
Environmental Team Lead
Trainer Refinery
ConocoPhillips
Trainer Refinery
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Trainer, PA 19061
Phone 610.364.8102
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Milind.J.Bhatte@ConocoPhillips.com

June 20, 2008

Director, Air Enforcement Division (**Certified Receipt: 7006 0810 0002 4565 9775**)
Office of Regulatory Enforcement
U.S. Environmental Protection Agency
Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460-0001

Regional Air Program Manager (**Certified Receipt: 7006 0810 0002 4565 9782**)
PA Department of Environmental Protection
Southeast Regional Office
2 East Main Street
Norristown, PA 19401

RECEIVED

JUN 27 2008

Air Protection Division (3AP12)

RE: ConocoPhillips Trainer Refinery May 9 2008 hydrocarbon flaring incident

Dear Directors:

Paragraphs 167 and 153 of the referenced Consent Decree (Civil Action H-05-0258) between the United States, the Pennsylvania Department of Environmental Protection (PADEP), and other states and localities and ConocoPhillips Company (COPC) requires a Root Cause Analysis be performed for any hydrocarbon flaring incident by no later than forty-five (45) days following the end of the incident. The attached report summarizes the incident investigation and the single root cause analysis for the intermittent and/or continuing hydrocarbon flaring incident associated with the Sour Water Stripper (SWS) Gas Flare.

Unlike acid gas or tail gas incidents, hydrocarbon incidents are typically not required to be submitted to regulatory agencies within 45 days. However, Paragraph 167(b) of the Consent Decree indicates that COPC may submit a single RCA for hydrocarbon flaring incidents involving one or more root causes that routinely recur. This letter constitutes that submittal.

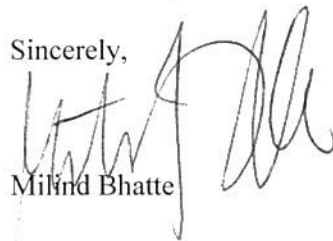
The SWS Gas Flare at the Trainer Refinery has not yet been certified in accordance with Paragraph 139. It is a small flare with two flare headers that meet just before the flare tip. One header receives gases from malfunctions or upsets associated with the sour water stripper unit.

The other flare header associated with this flare collects vent gas from the sour water storage tank that feeds the Sour Water Stripper. Thus, this gas is not SWS gas as define in the Consent Decree. As part of implementation of the Consent Decree signed by ConocoPhillips with EPA, PADEP and other regulatory

agencies, Trainer Refinery is in the process of commissioning a new H₂S analyzer on this flare header. The new H₂S analyzer on the Sour Gas Flare monitors the vent gas from the Sour Water Storage Tank (#34T1). A nitrogen purge is routed through the tank vapor space to ensure a slight positive pressure and is vented to the Sour Gas Flare.

Based on currently available data, it appears that while the emissions of sulfur dioxide are verifiably less than 500 pounds of sulfur dioxide on some days, the emissions may exceed 500 pounds on others. Hence, as a conservative measure, ConocoPhillips is submitting this single root cause analysis assuming that the emissions may exceed 500 pounds on a continuous or intermittent basis. The ongoing corrective actions for this incident are to complete those investigations and actions anticipated by the Consent Decree to make the flare Subpart J compliant. ConocoPhillips will continue to troubleshoot the new H₂S analyzer so that it can provide accurate information necessary to evaluate the most appropriate Subpart J option.

Sincerely,



Milind Bhatte

CC:

Chief (**Certified Receipt: 7006 0810 0002 4563 6318**)
Air Enforcement Branch (3AP12)
U.S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103

Director (**Certified Receipt: 7006 0810 0002 4563 6325**)
Air Enforcement Division
Office of Civil Enforcement
c/o Matrix New World Engineering Inc.
120 Eagle Rock Avenue, Suite 207
East Hanover, NJ 07936

Electronic copies to:
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foley.patrick@epa.gov
Reynolds.Cynthia@epamail.epa.gov

RCA - Hydrocarbon Flaring Incidents – Trainer Refinery

Ongoing since discovery on May 7, 2008

In accordance with Paragraphs 167 - 169 of the Consent Decree between ConocoPhillips Company, the United States of America, and the State of Pennsylvania, ConocoPhillips hereby submits this root cause analysis (RCA) for this hydrocarbon flaring incident.

ConocoPhillips' estimate (as discussed below) indicates that this hydrocarbon flaring incident may result in a release from the SWS Gas Flare of greater than 500 lbs of SO₂ in a 24-hour period. This incident is in excess of the Hydrocarbon Flaring Incident trigger as defined by Paragraph 11(JJ) of the Consent Decree. The SWS Gas Flare has not yet been certified in accordance with Consent Decree Paragraph 139.

What happened

As part of implementation of the Consent Decree, Trainer Refinery is in the process of commissioning a new H₂S analyzer on one of the flare headers that vent to the SWS Gas Flare. On 5/7/08, data from the new H₂S analyzer indicated that the emissions from the flare were potentially above the Reportable Quantity for SO₂ (RQ of 500 lbs for this source).

The new H₂S analyzer on the SWS Gas Flare monitors the vent gas from the Sour Water Storage Tank (#34T1). This vent line does not receive gas from any other source. A nitrogen purge is routed through the tank vapor space to ensure a slight positive pressure and is vented to the flare. On May 7, 2008, the analyzer (ranged from 0 to 100,000 ppmv) was brought online. Around 9:40 AM on May 7, 2008, the analyzer showed H₂S concentration in excess of 80,000 ppmv. Using this concentration along with the metered nitrogen purge rate and a previous flare line velocity measurement, ConocoPhillips estimated that the projected 24-hour quantity of SO₂ flared at the flare at that time would exceed the RQ of 500 lbs.

Since the H₂S analyzer on the flare is a new analyzer, ConocoPhillips has been making efforts to understand the analyzer accuracy and the impact of operational adjustments on the H₂S readings. The H₂S analyzer has been intermittently operational since May 7, 2008. During the week of June 10, 2008, ConocoPhillips asked Weston Solutions to install a temporary analyzer onsite and verify the H₂S concentrations on this vent line over a period of several days. During this period, as verified by Weston Solutions, the concentrations of H₂S as indicated by the analyzer were in the range of 10,000 to 50,000 ppmv. The emissions of SO₂ as a result of these H₂S concentrations were less than 500 pounds. However, shortly after the test, the new analyzer began malfunctioning and is not operational at this time.

The SO₂ emissions estimate from the SWS Gas Flare has largely been based on an estimated flow and the concentration detected by the new H₂S analyzer. The flow rate estimate is based on some tracer tests that were recently performed where specific nitrogen purge rates were translated into total vapor flow rates. Based on best available

information from the analyzer and interpolating where data were not available, the SO₂ emissions from the SWS Gas Flare could be higher than 500 pounds in a 24-hour period. During the week of June 10, when the readings were verified by Weston, the SO₂ emissions were less than 500 pounds.

At this time, ConocoPhillips believes that the SO₂ emissions from this flare may be intermittently or continuously above 500 pounds on a 24-hour basis. Consequently, ConocoPhillips continues its troubleshooting efforts for both the process and the analyzer to optimize and verify the emissions. However, at this time, as a conservative measure, given the possibility of the daily emissions exceeding the reportable quantity, ConocoPhillips is submitting a single root cause analysis for this flaring. The single root cause analysis is intended to cover the period until the flare will be certified as a Subpart J flare under the Consent Decree.

The remainder of this report follows the outline provided in Paragraphs 153(a)-(e) and 154.

153(a) Date/Time of Event: This “hydrocarbon flaring incident” for this flare began and ended at the dates and times listed in the table below:

Incident #	Start Date	Start time	End Date	End time	Emission amount
1	5/7/2008	9:40AM	Ongoing	Ongoing	Range of less than 500 lbs/24 hrs to greater than 500 lbs/24 hrs

153(b) Estimate of Quantity of SO₂: It is estimated that the SO₂ emissions from this SWS Gas Flare “Hydrocarbon Flaring Incident” are range from less than 500 pounds (as estimated the week of June 10) to 750 pounds per day (as estimated at the time of initial analyzer start up on May 7, 2008). These ranges were calculated by using the following formula as required by the Consent Decree:

$$\text{Tons of SO}_2 = (\text{FR}) * (\text{TD}) * (\text{Conc H}_2\text{S}) * (8.44 \times 10^{-5})$$

(FR) = Average Flow Rate to Flaring Device during Flaring, in standard cubic feet per hour

(TD) = Total Duration of Flaring in hours

(Conc H₂S) = Average concentration of Hydrogen Sulfide in gas during Flaring (or immediately prior to Flaring if all gas is being flared) expressed as a volume fraction (scf H₂S/scf gas)

$$8.44 \times 10^{-5} = [\text{lb mole H}_2\text{S}/379 \text{ scf H}_2\text{S}][64 \text{ lbs SO}_2 / \text{lb mole H}_2\text{S}][\text{Ton}/2000 \text{ lbs}]$$

153(c) - Measures to Limit Duration/Quantity:

As noted above, the SO₂ emissions from this event are not accurately known. However, it is known that the source of the H₂S is the vent gas from the tank. A diesel layer is maintained on top of the sour water storage tank to limit release of H₂S. Once the H₂S analyzer has been repaired and operational for an extended period of time, ConocoPhillips will use the data from the analyzer to determine whether any additional strategies may be employed to further limit the release of the H₂S in the vent gas and/or to minimize the flaring of this gas.

153(d) - Root and Contributing Causes:

The root cause of the incident is the vent off the sour water storage tank. Under certain conditions, flaring of the vent gas may contribute more than 500 pounds of sulfur dioxide emissions in a 24-hour period.

153(e) and 154 - Measures to Address Root / Contributing Causes & Corrective Actions:

Root Cause Finding	Action Item(s)	Proposed Dates
Vent off the sour water storage tank may result in emissions of sulfur dioxide greater than 500 pounds in a 24-hour period.	Study the emissions off the storage tank vent and identify and implement a compliance strategy consistent with consent decree options.	Updates will be provided in the July and January semi-annual reports. The flare will be certified by the required December 31, 2011 deadline.

